STATE OF ILLINOIS

ENVIRONMENTAL PROTECTION AGENCY

DIVISION OF LAND/NOISE POLLUTION CONTROL

GROUNDWATER WITHDRAWALS FROM AQUIFERS IN ILLINOIS WITH EMPHASIS ON PWS WELLS

by
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AQUIFERS OF ILLINOIS

Subsequent to consultation with the ISGS and ISWS, the IEPA identified the aquifers in Illinois. These aquifers are shown in descending order in Table B.

Table B. Aquifers of Illinois

Name of aquifers (abbreviation)		General lithology
Quaternary	(Q)	Sands and gravels**
Cretaceous-Tertiary	(K-T)	Sands and gravels**
Pennsylvanian	(Pen)	Sandstones, limestones, and coals**
Chesterian	(MCh)	Sandstones and limestones**
Valmeyeran	(MVa)	Sandstones and limestones
Silurian-Devonian	(S-D)	Dolomites and limestones
*Maquoketa	(Maq)	Dolomites and fractured shales**
Galena-Platteville	(G-P)	Dolomites and limestones
Glenwood-St. Peter	(G-StP)	Sandstones
*Prairie du Chien	(PduC)	Dolomites and sandstones
Eminence-Potosi	(E-P)	Dolomites
*Franconia	(F)	Sandy dolomites
Ironton-Galesville	(I-G)	Sandstones
Elmhurst-Mt. Simon	(E-MtS)	Sandstones

* Considered of minor importance, refer to text for details

**Rock types listed may be water yielding but generally make up less than half of the total rock thickness in the indicated units.

Properties of these aquifers are briefly described under the heading "Description of Aquifers Utilized by PWS Wells". Their detailed discussion are included in another report entitled "Aquifers of Illinois: Underground Sources of Drinking Water and Non-Drinking Water" by Student et al. (1981). Some of these aquifers are hydrologically connected and are identified as hydrostratigraphic units in parts of the State. One of the best known hydrostratigraphic units in northern Illinois is the Cambrian-Ordovician aquifer which consists of the Ironton-Galesville, Franconia, Eminence-Potosi, Prairie du Chien, Glenwood-St. Peter, and the Galena-Platteville. However, the IEPA has elected to retain individual aquifer designations due to variations in aquifer properties over a statewide basis. The wells in various use categories primarily obtain water from either the individual aquifers in Table B or any combination of them.

As indicated in Table B, three of these aquifers, the Maquoketa, Prairie du Chien, and Franconia are of "minor" importance. In the case of the Maquoketa, lithologic variations from fractured limestone, dolomite, and shales to a predominate shale group, cause a reduction of water yielding capability. Indeed, over a larger portion of Illinois, the Maquoketa is more often considered an aquitard or a confining bed rather than an aquifer. The Prairie du Chien and the Franconia are usually left open to multiple aquifer wells which penetrate to deeper sandstone aquifers. Their respective yields relative to the deeper aquifers, such the Ironton-Galesville and the Elmhurst-Mt. Simon, are of lesser quantities.

The reported well depths and yields vary from 190 to 1,640 feet, and from 33 to 2,900 gpm (Table 8). Group I PWS facilities through 36 wells withdraw 5.8 mgd of water from this aquifer (Table 14A).

Galena-Platteville: The upper part of the aquifer is known to be the most water productive. This is predominately affected by the development of crevices and solution channels within the dolomite. In areas where the Galena-Platteville is the uppermost bedrock and underlies glacial drift, crevices can be well developed and the aquifer is capable of yielding moderate quantities of ground water. Where overlain by the shales of the Maquoketa, development of crevices is less pronounced and well yields are diminished (Sasman and Baker, 1966).

The Galena-Platteville aquifer is mostly intercepted in multiple aquifer wells, 384 (Tables 13 and 15); it is also open to 12 single aquifer wells (Tables 7 and 15). The well locations are shown on Plates 5 and 13. The depth and yield of single aquifer wells range from 243 to 1,150 feet and 35 to 390 gpm, respectively. Five Group I PWS facilities with six single aquifer wells withdraw over 0.159 mgd of ground water from this aquifer (Table 14A).

Maquoketa: The Maquoketa is considered a minor aquifer, although in the large areas of the State where the lithology is predominantly shale, it is considered an aquitard. Small to moderate quantities of ground water are obtained from the dolomite beds in it. These beds are best developed in the following counties: eastern De Kalb, Kane, southern Lee, southwestern Stephenson, eastern Whiteside, and most of Jo Daviess (Sasman and Baker, 1966). There are at least 100 multiple aquifer wells and also seven single aquifer wells open to the Maquoketa aquifer (Tables 11, 13, and 15). The location of the wells is shown on Plates 6 and 13. The reported well depths and yields of single aquifer wells are from 180 to 375 feet and 25 to 400 gpm, respectively (Table 11). Two Group I public water supply facilities with four wells withdraw 0.132 mgd of ground water from this aquifer (Table 14A).

Silurian-Devonian: Ground water in this carbonate aquifer occurs in joints, solution cavities, and fissures which are irregularly distributed both vertically and horizontally. These openings are interconnected on an areal basis and can extend for considerable distances. However, the upper part of the rocks tend to be more permeable than the lower part (Csallany and Walton, 1963). The Silurian-Devonian aquifer is mostly open to single aquifer wells, 438 (Table 6), and has been intercepted in 121 multiple aquifer wells (Table 15). The location of these wells is shown on Plates 7 and 13. Over 35.5 mgd of ground water is withdrawn from this aquifer through 218 wells in 122 Group I PWS facilities (Table 14A). This is the second largest withdrawal, after the Quaternary aquifer, in Group I facilities. The reported well depths vary from 20 to 1,500 feet while well yields are between 84 and 1,193 gpm (Table 6).

Table 6. Silurian-Devonian aquifer, public water supply wells

County	Pumping facility	Population (pop./yr)	Average daily pumpage of facility (gpd/yr)	No. of wells	Well location (sec.,T/R)	Well depth (feet)	Well yield (gpm)	Remarks
Bureau	Bureau Junction	466	21,300/76	2	17,15N-10E	305-334	Flowing	
	Mineral	286	25,000/76	2	8,16N-6E	375-447	30	
Cook	Barrington (Lake Co.)	7,701	* 1,170,000/73	2	1,42N-9E	210-305	850	See table 1 (Lake Co.)
	Bartlett	3,501	* 938,000/78	2	34,41N-9E	200	300	See tables 1 and 13 (DuPage Co.) table 1 (Cook Co.)
	Burr Ridge (DuPage County)	1,637	238,000/77	3 (1)	18,19,38N-12E	354-365	Un-280	See table 6 (DuPage Co.)
	Chicago Hts.	40,900	* 7,200,000/77	13	17,19,20,21, 28,29,30,35N-14E	203-484	500-1500	See table 13
	Citizen's Fernway Subdivision (S.E. of Orland Park)			(1)	23,36N-12E	125	450	See table 13
	Citizen's Waycind Park Subdivision (S.of Mt.Prospect)			(1)	14,41N-11E	236	125	See table 13
	Country Club Hills	6,920	1,120,000/79	6 (3)	3,35N-13E 10,26,34,36N-13E	373-450	350-900	
	Crestwood			(1)	33,37N-13E	345	300	Surface water is main supply (Chicago via Alsip)

Table 6. Silurian-Devonian aquifer, public water supply wells (con't)

County	Pumping facility	Population (pop./yr)	Average daily pumpage of facility (gpd/yr)	No. of wells	Well location (sec.,T/R)	Well depth (feet)	Well yield (gpm)	Remarks
Cook	E.Chicago Hts.	5,000	* 1,000,000/78	5 (1)	23,35N-14E	460-499	100-1000	See table 13
	Flossmoor	8,328	* 1,100,000/77	4 (3)	2,12,35N-13E 6,35N-14E	351-505	250-600	See table 13
	Glenwood			(2)	5,9,35N-14E	222-426	110-300	See table 13
	Hanover Park (DuPage County)			(1)	36,41N-9E	202	200	See table 13 (Cook & DuPage Co.)
	Hoffman Estates	22,238	* 3,200,000/77	3	15,41N-10E	222-252	350-400	See tables 1 & 13
	Homewood	18,871	* 2,500,000/77	6 (3)	5,35N-14E 31,36,36N-14E	250-420	225-650	See table 13
	Indian Head Park	473	230,000/77	3 (1)	19,20,38N-12E	402-415	500-600	
	Lemont			(1)	29,37N-11E	241	600	See table 13
	Matteson	4,741	1,245,949/79	6	16,17,21,22, 26,35N-13E	282-450	350-1100	
	Mission Brook Sanitary Dist.(N. of Northbrook)	1,300/78	* 272,000/78	2	17,42N-12E	237-386	100-275	See table 13
	Mt. Prospect	45,228	* 4,000,000/78	3 (1)	10,11,12, 41N-11E	193-291	100	See table 13
	Olympia Fields	3,478	586,000/79	2	14,35N-13E	270-445	500-1000	
	Orland Park	6,391	* 1,833,000/77	6	2,4,9,10,17 36N-12E	397-517	200-750	See tables 10 & 13
	Park Forest	30,864	2,500,000/79	7	23,25,30,36 35N-13E	300-402	600-1500	

Table 6. Silurian-Devonian aquifer, public water supply wells (con't)

County	Pumping facility	Population (pop./yr)	Average daily pumpage of facility (gpd/yr)	No. of wells	Well location (sec.,T/R)	Well depth (feet)	Well yield (gpm)	Remarks
Cook	Prospect Meadows Subdivision (N.of Mt. Prospect)	600/78	35,050/78	1	27,42N-11E	201	175	
	Richton Park	2,558	753,000/79	2	27,33,35N-13E	418-439	500-800	
	Sauk Village	7,479	811,000/77	2	25,35N-14E	470-474	660-1000	
	Schaumberg	18,730	* 5,306,000/78	7	12,13,20,21, 24,28,32 41N-10E	206-390	250-700	See tables 1 & 13
	S. Chicago Hts.	4,923	* 789,000/78	2 (1)	29,33,35N-14E	250-493	500-700	See table 13
	Steger (Will County)	8,104	840,000/77	1	33,35N-14E	378	550	See table 6 (Will County)
	Western Springs			(2)	5,38N-12E	313-364	250-500	See table 13
	Wheeling	13,243	* 1,800,000/78	3	10,11,12 42N-11E	200-281	200-400	See table 13
Douglas	Villa Grove	2,605	207,000/76	2	10,16N-9E	627-645	250	
DuPage	Addison	24,482	* 4,500,000/77	4	19,28,33, 40N-11E	155-250	300-1000	See table 13
	Belmont-Highwood Public Water District	581/79	58,000/79	2	12,38N-10E	148-295	400-500	
	Black Hawk Hts. Subdivision (near Westmont)	1,015/77	66,700/77	1	10,38N-11E	295	200	